

Appendix C10. Mad River Steelhead Surveys

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C10.1 METHODS

Comprehensive dive counts of adult summer steelhead in the Mad River were conducted since 1994. These surveys were made in response to sharp declines in summer steelhead counts within index reaches surveyed annually by U.S. Forest Service personnel upstream of Green Diamond's Mad River property. Counts of both adult (over 16") and half-pounder (12"-16") sized summer steelhead were made. If possible, the presence or absence of an adipose fin was noted on all adult summer steelhead because all summer steelhead produced by Mad River Hatchery have an adipose fin clip.

The snorkel surveys were organized by California Trout and were a cooperative effort involving personnel from California Trout, Green Diamond, CDFG, USFWS, U.S.D.A. Forest Service, Coastal Stream Restoration, Trinity River Associates, Douglas Parkinson and Associates, Natural Resources Management Corporation, and Redwood Community Action Agency.

The portion of the survey identified as the Green Diamond reach extends from Deer Creek to the Department of Fish and Game's Mad River Hatchery. This segment consists of eight reaches for a total of approximately 36 miles of the Mad River:

- Reach 1: Deer Creek to Humbug Creek, 4.0 miles
- Reach 2: Humbug Creek to Big Bend, 4.6 miles
- Reach 3: Big Bend to Goodman Prairie, 4.3 miles
- Reach 4: Goodman Prairie to Church Camp, 3.7 miles
- Reach 5: Church Camp to Butler Valley Ranch, 5.8 miles
- Reach 6: Butler Valley Ranch to 4510, 3.7 miles
- Reach 7: 4510 road crossing to 4090 road crossing, 5.0 miles
- Reach 8: 4090 road crossing to Mad River Fish Hatchery, 4.7 miles

Since 1982 the U.S. Forest Service has surveyed 2 Index reaches upstream of the Green Diamond property from Ruth Dam downstream to Deer Creek. Since 1994 CDFG has surveyed the following reaches of the Mad River upstream of the Green Diamond property:

- Reach 1:
(1994-1998): Deer Creek to Humbug Creek, 4.0 miles
- Reach 2:
(1994, 1997, 1998): Humbug to Big Bend, 4.6 miles
(1995) Humbug to Wilson, 2.8 miles
(1995): Humbug to Swing Bridge, 6.2 miles

California Department of Fish and Game annually surveys the Mad River in the reach downstream of Green Diamond property from the Mad River Hatchery to Kadle Hole near the Highway 299 bridge.

C10.2 RESULTS

The 1994 snorkel surveys were conducted on August 26th and September 27-28, 1994 and covered a total of 59.8 miles of channel between Nelson Flat and the Mad River Hatchery. A total of 306 adult steelhead (265 with adipose fins, 3 with adipose clips, and 38 unknowns) and 172 half-pounder (67 with adipose fins, 0 with adipose clips, and 105 unknowns) were observed (Table C10-1). Nearly half the adult summer steelhead (141) were congregated in two pools. These pools were located below large falls (10-15 feet) over boulders that were probably low flow barriers and most of the steelhead observed below these falls were scarred and bruised. These barriers probably influenced the low fish counts in the Forest Service index reach (only 19 adult summer steelhead in 24 miles of channel) and illustrated the need for more complete surveys.

Table C10-1. Total number of summer steelhead observed in snorkeling dives on the Mad River, 1994-2000.

Year	Forest Service Reaches	Green Diamond Reaches		CDFG Reaches		All Reaches
	(Ruth Dam to Deer Creek)	(Deer Creek to Hatchery)		(Hatchery to Kadle Hole)		
	(in consistent or in-complete)	Adults (clips)	½ pounders (clips)	Adults (clips)	½ pounders (clips)	Total (clips)
1994	18	287 (3)	172 (0)	0 (0)	0 (0)	477 (3)
1995	41	501 (6)	10 (0)	27 (0)	11 (0)	552 (6)
1996	5	422 (41)	26 (0)	88 (0)	0 (0)	541 (41)
1997	5	225 (2)	12 (0)	54 (2)	0 (0)	296 (4)
1998	13	176 (0)	12 (0)	12 (0)	8 (0)	221 (0)
1999	No Survey	78 (0)	15 (0)	7 (0)	10 (0)	110 (0)
2000	No Survey	80 (0)	54 (0)	45 (15)	7 (0)	186 (15)

The 1995 snorkel surveys were conducted between August 24th and 26th and covered a total of 72.8 miles of channel, from Matthews Dam downstream to the Highway 299 bridge. A total of 569 adult steelhead (400 with adipose fins, 6 with adipose clips, and 163 unknowns) and 21 half-pounders (4 with adipose fins, 0 with adipose clips, and 17 unknowns) were observed (Table C10-1). Most of the adult summer steelhead (479 fish) was congregated in the upper two reaches, with large numbers of fish in several pools immediately below the upper falls. Only 40 adult summer steelhead were observed in the nearly 30 miles of channel surveyed above the upper falls.

The 1996 snorkel surveys were primarily conducted on August 26th-27th (with reach #4 completed on September 3rd) and covered the entire river from Matthews Dam downstream to the Highway 299 bridge. A total of 515 adult steelhead (408 with adipose fins, 41 with adipose clips, and 66 unknowns) and 26 half-pounders (12 with adipose fins

and 14 unknowns) were observed (Table C10-1). Most of the adult summer steelhead (305 fish) was congregated in the two reaches downstream of the falls, with large numbers of fish in several pools immediately below the falls. Only five adult summer steelhead were observed in the nearly 30 miles of channel surveyed above the falls.

The 1997 snorkel surveys determined that a total of only 288 adult steelhead (284 with adipose fins, 4 with adipose clips) and 12 half-pounders (none with adipose fin clips) were observed (Table C10-1). The 1998 snorkel surveys resulted in steelhead counts of 201 adults (87 with unclipped adipose fins and at least 89 unknown) and 20 half-pounders (all with unclipped adipose fins).

In 1999, the US Forest Service reaches were not surveyed so the total number of steelhead observed were from Deer Creek to Kadle Hole and included the Green Diamond and CDFG reaches. The Green Diamond reaches were snorkeled on August 25th (reaches 1-5) and 26th (reaches 6-8). In 1999 only a total 85 adult steelhead were observed within the surveyed area. Of these 85, only seven adults were confirmed have been adipose fin clipped. In addition 25 half-pounders were observed within these reaches (Table C10-1), none of which were confirmed to have been ad fin clipped.

In 2000, the US Forest Service reaches were not surveyed so the total number of steelhead observed were from Deer Creek to Kadle Hole and included the Green Diamond and CDFG reaches. The Green Diamond reaches were snorkeled on August 31st (reaches 1-5, 8) and September 1st (reaches 6-7). The CDFG reaches were surveyed on August 25th. In 2000 only a total 80 adult steelhead were observed within the surveyed area. Sixteen of these adults were unknown as to whether they were adipose fin clipped or not and 15 were observed with adipose clips. An additional 54 half-pounders were observed within these reaches (Table C10-1).

C10.3 DISCUSSION

The Mad River summer steelhead dives revealed the importance of conducting complete surveys, as opposed to making basin-wide estimates from index reaches. Prior to 1994 information about Mad River summer steelhead was derived solely from the numbers observed within the Forest Service index reach (above the falls). Until recently some biologists considered the Mad River wild summer steelhead population in danger of extinction. However the 1994-2000 results indicate that the Mad River sustains one of the larger known populations in California, especially considering that dive surveys actually provide a minimal count of only the fish actually observed by divers.

Figure C10-1 summarizes the total numbers of summer steelhead observed in the Mad River for the years 1994-2000. From this information it appears that there is a trend that, since the 1996 dive survey, there has been a decline in the total number of summer steelhead in the Mad River (Figure C10-1). This maybe a result of many factors including differing water-year types, habitat conditions, spawning and rearing success as well as ocean and climatic conditions in the years prior to these surveys.

Mad River Summer Steelhead Survey

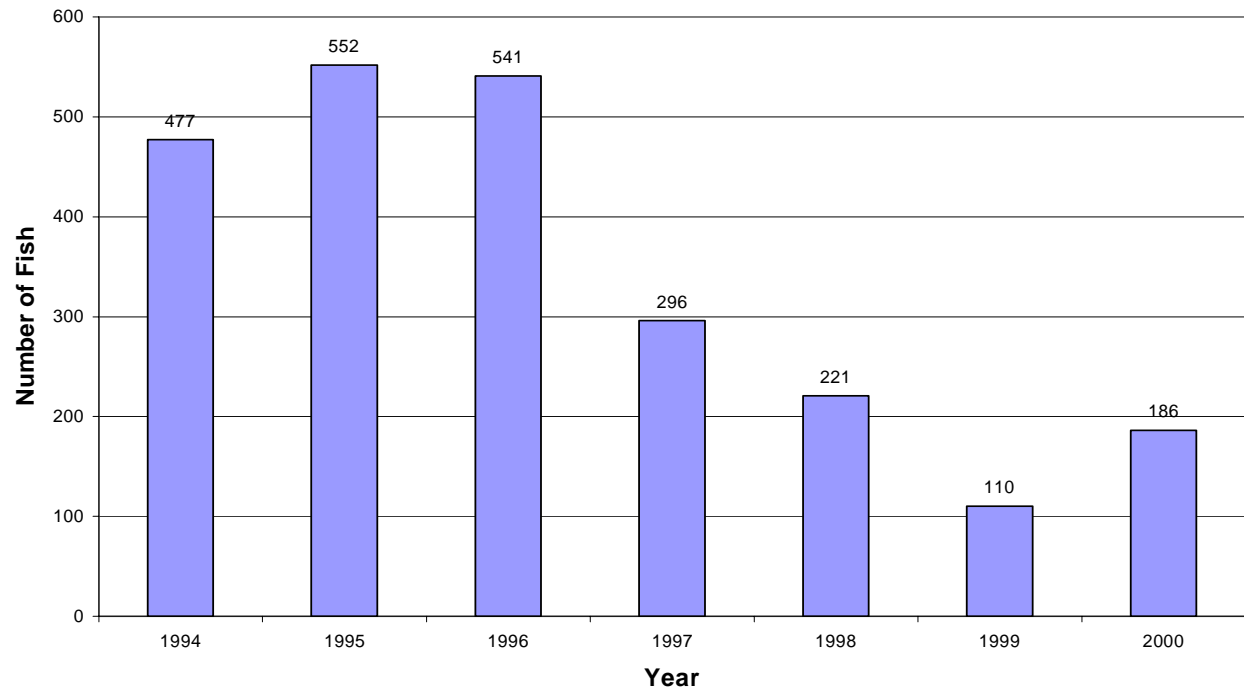


Figure C10- 1. Summary of the total number of Mad River summer steelhead observed (1994-2000).

C10.4 CONCLUSIONS

By conducting the 100 percent surveys annually, the best data for tracking long-term population trends of Mad River summer steelhead will be obtained. The survey results have already resulted in changes in steelhead management by CDFG to better protect this population of wild summer steelhead. Fishing regulations were recently modified to reduce potential impacts from sport fishing by extending the catch-and-release section and prohibiting all fishing within the channel reach where most of the adults are observed. CDFG also terminated its summer steelhead program at the Mad River Hatchery to eliminate the potential for genetic and/or disease exchange from the non-native hatchery fish to the native population.

